

REMARKS

Claims 1-14 were pending in this application.

Claims 15-17 were added.

Accordingly, claims 1-17 are pending in the subject application.

Applicants request reconsideration of the pending claims in light of the above claim amendment taken along with the following remarks.

Claim Rejection under 35 U.S.C. 102

Claim 1 stand rejected under 35 U.S.C. §102(e) as being anticipated by Jang et al. (U.S. Patent No. 6,362,093; hereinafter Jang). The May 10, 2005 Office Action (hereinafter Office Action) noted that Jang does not explicitly disclose the use of an etch gas that makes an etch selectivity of the upper intermetal dielectric layer with respect to the bottom protecting layer to be about 0.5 to about 1.5. The Office Action urges that Jang's passage in col. 10, lines 55-65 teaches use of an etch gas "that etches the bottom protecting layer at a rate at least somewhat lower than the upper intermetal dielectric layer....therefore, the selectivity of the upper intermetal dielectric layer with respect to the bottom protecting layer must be approximately or greater than 1". Applicants respectfully traverse this rejection.

As taught by the disclosure of the instant application, one reason to choose a sensitivity of about 0.5 to about 1.5 is to avoid the formation of a byproduct or an oxide fence (see, e.g., page 14, lines 2-6 of the instant application). Jang discloses the etching of the protective layer at a rate at least somewhat lower than the upper dielectric layers so that the protective layer rises above the intermediate dielectric layers for a reduced height via (col. 10, lines 60-65). As such, Jang's selectivity (the etch rate ratio) need only be approximately or greater than 1, but not about 0.5 to about 1.5.

Accordingly, Jang does not teach or suggest applicants' claim 1, *inter alia*, wherein the second etch recipe uses an etch gas that makes an etch selectivity of the upper intermetal dielectric layer with respect to the bottom protecting layer to be about 0.5 to about 1.5.

Applicants respectfully request reconsideration and withdrawal of the rejection to claim 1 under 35 U.S.C. §102(e) as being anticipated by Jang.

Claim Rejection under 35 U.S.C. 103

Claim 2 is rejected under 35 U.S.C. §103(a) as being unpatentable over Jang as applied to claim 1 above, and further in view of Hill et al (U.S. Patent No. 6,753,250; hereinafter Hill). The Office Action urged that it would have been obvious to one having ordinary skill in the art, at the time of the invention, to modify Jang in view of Hill by using silicon oxycarbide because equivalent and substitution of one for the other would produce an expected result. Applicants respectfully traverse this rejection.

The motivation to modify the prior art must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. There is no such teaching in Hill.

As discussed above, Jang does not teach or suggest applicants' claim 1. Hill does not cure the deficiency in Jang to arrive at applicants' claim 1, *inter alia*, wherein the second etch recipe uses an etch gas that makes an etch selectivity of the upper intermetal dielectric layer with respect to the bottom protecting layer to be about 0.5 to about 1.5. Accordingly, claim 1 is patentable over Jang, and further in view of Hill. Since claim 2 is dependent on claim 1, claim 2 is also patentable. Reconsideration and withdrawal of the rejection to claim 2 is respectfully requested.

Claim 3 is rejected under 35 U.S.C. §103(a) as being unpatentable over Jang as applied to claim 1 above, and further in view of Wang et al (U.S. Patent No. 6,057,239; hereinafter Wang). The Office Action urged that it would have been obvious to one having ordinary skill in the art, at the time of the invention, to modify Jang in view of Wang by using HSQ because equivalent and substitution of one for the other would produce an expected result. Applicants respectfully traverse this rejection.

The motivation to modify the prior art must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. There is no such teaching in Wang.

As discussed above, Jang does not teach or suggest applicants' claim 1. Wang does not cure the deficiency in Jang to arrive at applicants' claim 1, *inter alia*, wherein the second etch recipe uses an etch gas that makes an etch selectivity of the upper intermetal dielectric layer with respect to the bottom protecting layer to be about 0.5 to about 1.5. Accordingly, claim 1 is patentable over Jang, and further in view of Wang. Since claim 3 is dependent on claim 1, claim

3 is also patentable. Reconsideration and withdrawal of the rejection to claim 3 is respectfully requested.

Claims 4-9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Jang as applied to claim 1 above, and further in view of Bjorkman et al (U.S. Patent No. 6,858,153; hereinafter Bjorkman). The Office Action urged that it would have been obvious to one having ordinary skill in the art, at the time of the invention, to modify Jang in view of Bjorkman by using etch gas that comprises C_4F_8 and CF_4 because this composition is capable of etching dielectric material with high uniformity for claims 4-8 and that the flow rate ratio of high ratio fluorocarbon (C_4F_8) with respect to low ratio fluorocarbon is $20 \text{ sccm}/40 \text{ sccm} = 0.5$ (reading on applicants' range) for claim 9. Applicants respectfully traverse this rejection.

The motivation to modify the prior art must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. There is no such teaching in Bjorkman.

As discussed above, Jang does not teach or suggest applicants' claim 1. Bjorkman does not cure the deficiency in Jang to arrive at applicants' claim 1, *inter alia*, wherein the second etch recipe uses an etch gas that makes an etch selectivity of the upper intermetal dielectric layer with respect to the bottom protecting layer to be about 0.5 to about 1.5. Accordingly, claim 1 is patentable over Jang, and further in view of Bjorkman. Since claims 4-9 are dependent on claim 1, claims 4-9 are also patentable. Reconsideration and withdrawal of the rejection to claims 4-9 are respectfully requested.

Claims 10-14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Jang as applied to claim 1 above, and further in view of Dalton et al (U.S. Patent No. 6,720,249; hereinafter Dalton). The Office Action urged that it would have been obvious to one having ordinary skill in the art, at the time of the invention, to modify Jang in view of Dalton by using etching gas that comprises C_4F_8 and CHF_3 because this is a conventional etching gas for the dielectric materials for claims 10-13 and that the flow rate ratio of high ratio fluorocarbon (C_4F_8) with respect to fluorohydrocarbon is $100 \text{ sccm}/100 \text{ sccm} = 1$ (reading on applicants' range) for claim 14. Applicants respectfully traverse this rejection.

The motivation to modify the prior art must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. There is no such teaching in Dalton.

As discussed above, Jang does not teach or suggest applicants' claim 1. Dalton does not cure the deficiency in Jang to arrive at applicants' claim 1, *inter alia*, wherein the second etch recipe uses an etch gas that makes an etch selectivity of the upper intermetal dielectric layer with respect to the bottom protecting layer to be about 0.5 to about 1.5. Accordingly, claim 1 is patentable over Jang, and further in view of Dalton. Since claims 10-14 are dependent on claim 1, claims 10-14 are also patentable. Reconsideration and withdrawal of the rejection to claims 10-14 are respectfully requested.

New claims 15-17 define a process of forming the bottom interconnection which is neither disclosed nor suggested by Jang.

For the foregoing reasons, applicants respectfully submit that the instant application, namely claims 1-17, is in condition for allowance. Early and favorable action is earnestly solicited.

If a telephone conference would be of assistance in furthering prosecution of the subject application, applicants request that the undersigned be contacted at the number below.

Respectfully submitted,



Frank V. DeRosa
Reg. No. 43,584
Attorney for Applicants

F. Chau & Associates, LLC
130 Woodbury Road
Woodbury, NY 11797
Tel: (516) 692-8888
Fax: (516) 692-8889